INTERNATIONAL TRADE ADMINISTRATION

2015 Top Markets Report
Renewable Fuels

A Market Assessment Tool for U.S. Exporters

July 2015

U.S. Department of Commerce | International Trade Administration | **Industry & Analysis (I&A)**

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Executive Summary and Key Findings

The *2015 Renewable Fuel Top Markets Report* covers two industries in which the United States is currently the largest exporter in the world: fuel ethanol and biomass wood pellets. Previously part of ITA's *Renewable Energy Top Markets Report*, this report ranks 20 different markets in terms of U.S. export potential for the 2015-2016 period. These two sectors rely on favorable renewable energy policy environments in foreign countries to drive demand for exports. As they face increasing challenges globally, fuel ethanol and wood pellet producers should seek to leverage U.S. government resources to overcome barriers and open new markets. This report is designed to serve as a tool to help U.S. exporters by identifying and prioritizing markets for each sector. The countries included in this analysis range from those with strong export growth potential to markets where exporters face significant obstacles.

U.S. export performance – in terms of rising exports and market share – for both fuel ethanol and wood pellets is currently very strong. However, both industries are dependent on foreign markets for future growth, without which these industries will stagnate or decline. In addition to fluctuations in price, trade in these products is correlated with the existence of renewable energy policies that support the use of these renewable fuels.

In the case of ethanol – which is already blended in gasoline in low volumes as an oxygenate – the primary policy driver for larger volumes is usually a national-level blending mandate that increases blend targets over time for the gasoline pool. For wood pellets, renewable energy policies are again involved to encourage the partial or complete conversion of coal-fired heat and power plants to biomass to reduce carbon emissions. This has created demand for wood pellets, which have a higher energy density compared to other biomass feedstocks.

With these factors in mind, this report narrows the field to the most promising export markets, based on two key factors for each country: 1) Significant U.S. export patterns for 2012-2014; and 2) The existence of supportive policy that maintains or grows domestic use of the renewable liquid fuels for transport (ethanol) and biomass for stationary heat and power (energy pellets). Figure 2 shows a breakdown by sector of the countries that are included in this year's rankings, meeting both of the above criteria.

A characteristic that emerged from the trade data is that ethanol exports represented a wide variety of regions, even within the top 20 markets where they are concentrated (although more than 100 countries have imported U.S. fuel ethanol in the past five years). Pellet exports, by contrast, were mostly to Europe with the exception of South Korea. Japan has also increased its use of foreign wood pellets, although U.S. producers have only captured a small share of that growing market. Due to the lack of overlap in the export markets, each sector will be ranked separately in this report, rather than combining the results of both sectors into one overall renewable fuels ranking.

For ethanol, several mid-level markets that ranked in the top 15 destinations for U.S. sales in 2014 (the UAE, Tunisia, and Singapore) are excluded. As will be explained further in the sector snapshots, some of these "destinations" are regional hubs with no domestic use mandates. In other words, the ethanol was redistributed to other countries, in some cases solely for discretionary use (that is, based only on low cost of ethanol and its use as an oxygenate in gasoline). While the importance of these markets is undisputed when ethanol prices are low relative to

Figure 1: Projected Top Markets for Renewable Fuel Exports (2015-2016)

Fuel Ethanol Exports		Biomass Wood Pellets	
1. Canada	7. Jamaica	1. United Kingdom	7. Sweden
2. Brazil	8. Peru	2. Belgium	8. Canada
3. Philippines	9. Finland	3. Italy	9. Germany
4. India	10. China	4. Netherlands	10. Japan
5. Mexico	11. Colombia	5. Denmark	11. France
6. Netherlands	12. United Kingdom	6. South Korea	

gasoline, they do not meet the second criteria to be included in this report.

Biodiesel, another liquid biofuel used in transportation, is also traded on the global market. It is blended with fossil diesel to lower greenhouse gas emissions, improve air quality in urban centers, and increase fuel lubricity thus extending engine life. However, biodiesel will not be covered in the 2015 report because unlike ethanol, the biodiesel industry is not dependent on foreign markets for short-term growth. It doesn't face a domestic blend wall and U.S. diesel use is growing. The biodiesel industry's strategy is to grow domestic use through annual increases in the RFS2 and maintain tax support through the blender's credit.

In addition, unlike ethanol, U.S. biodiesel exporters face severe price competition from exporters from Indonesia, Malaysia and Argentina who enjoy lower feedstock costs. In 2014, there were a limited number of export markets for U.S. biodiesel. Canada accounted for 85 percent of the biodiesel exports; the five largest destinations – Canada, Spain, Peru, Gibraltar and the Dominican Republic – together represented 99 percent of the exports.

Key Findings: Understanding Renewable Fuels Exports

Through the data-driven approach described in more detail below, ITA found several key trends that can guide export strategies for fuel ethanol and biomass wood pellets.

As renewable fuels, both ethanol and biomass wood pellet exports from the United States have increased dramatically over the past 5 years.

In 2010, U.S. fuel ethanol exports were an estimated 1.5 billion liters (See Figure 3)[1]. They peaked in 2011 at 4.5 billion liters. A nationwide drought affected production in 2012, which lowered exports as well. Further decline of exports in 2013 reflected reduced sales to the EU due to imposition of antidumping duties on U.S. ethanol. By 2014, exports overall were back up again to nearly 3.2 billion liters. This was spurred largely by gains in exports to our two largest markets (Canada and Brazil), and additional exports to non-EU markets, due to the low price of corn ethanol and increased discretionary blending.[2]

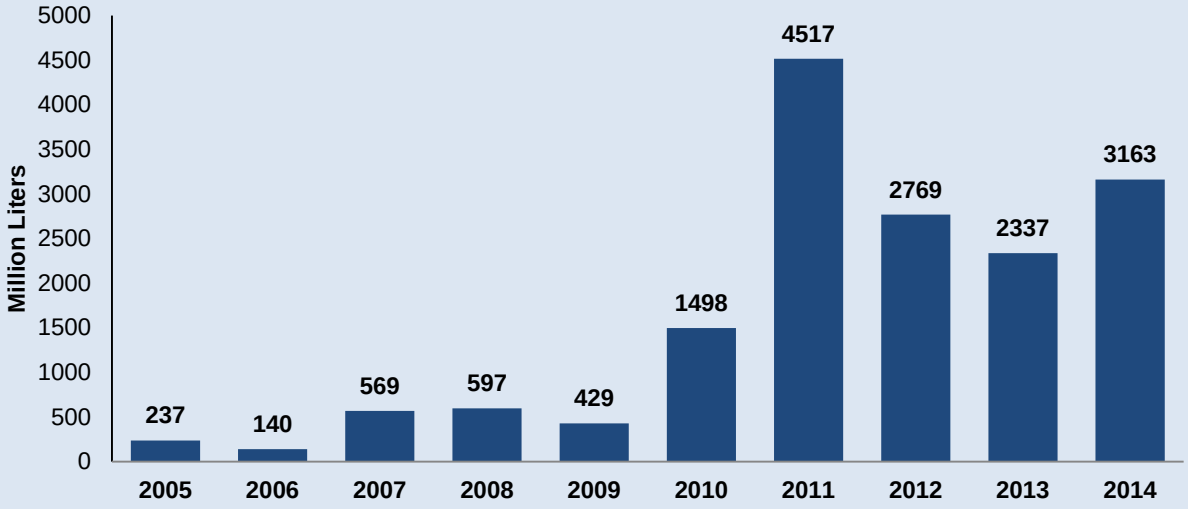
Figure 2: Countries Ranked in the Renewable Fuels Top Markets Report

	Ethanol	Pellets
Belgium		•
Brazil	•	
Canada	•	•
China	•	
Colombia	•	
Denmark		•
Finland	•	
France		•
Germany		•
Italy		•
India	•	
Jamaica	•	
Japan		•
Korea		•
Mexico	•	
Netherlands	•	
Peru	•	
Philippines	•	
Sweden		•
UK	•	•

Meanwhile, wood pellet exports from the United States increased eightfold since 2010, reaching 4 billion kg in 2014 (See Figure 4). Trade in wood pellets has been tracked since 2012 by a unique, 6-digit harmonized tariff code. Since the implementation of the tariff code, the global export market has grown from $1.7 billion per year to over $2.8 billion per year.[3] In 2014, the United States far outstripped its closest competitor for exports, Canada, whose exports reached 1.6 billion kg.[4]

The most noticeable pattern in both sectors was the emergence of Asian markets with growing import demand. For fuel ethanol, examples include the Philippines and India. For pellets, both South Korea and Japan have increased their intake of foreign wood

Figure 3: Annual U.S. Exports, Ethanol for Fuel



pellets in recent years, although the United States is capturing a small share of the import demand in both countries.

Undeniably, some trade partners will remain our largest export markets for the foreseeable future. Canada, which in 2014 imported 43 percent of its needs, will continue to be the largest importer of U.S. ethanol, but the question is whether emerging policies at the provincial level favoring lower greenhouse gas (GHG) emission fuels might be leveraged to increase imports even more. The UK, which ironed out its sustainability criteria for wood pellets last year, is by far the largest importer of wood pellets in the world (in 2014, the UK's imports reached 4.7 billion kg, which was 69 percent of its consumption) and the U.S. industry will continue to be the dominant supplier.

In both cases, U.S. producers have a large share of a large import market. However, there are also markets where the domestic consumption in the country is so large that even supplying a small percentage is a significant opportunity. Brazil, with its 27 percent blend requirement for gasoline and large flex-fuel fleet (giving consumers the ability to use up to 100 percent ethanol in their vehicles), has a high level of production and only needs to import 2 percent of its domestic consumption. Fortunately, U.S. ethanol exporters have captured the majority of that limited import market, which still accounted for over 450 million liters in 2014.

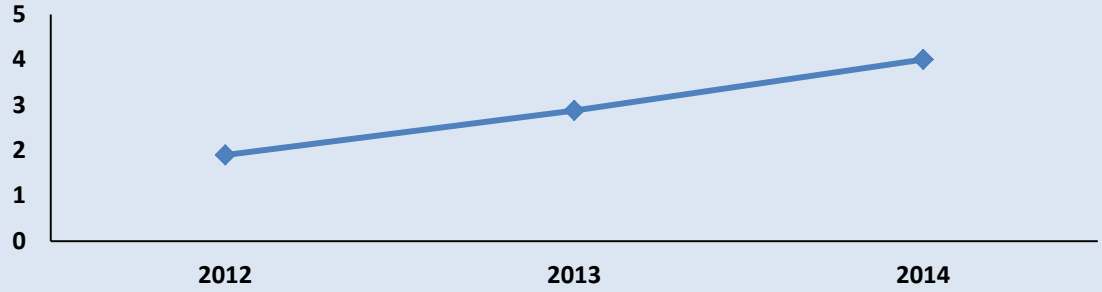
Another example of a small market share attracting a large volume from the United States is South Korea, which imported a total of 1.85 billion kg of wood pellets from the world in 2014. This amount was nearly four times the previous year's imports, reflecting its rapidly rising domestic consumption. Although U.S. pellet exports to South Korea have also grown exponentially since 2012, they captured only 3 percent of the total import demand in 2014 while Vietnam, Canada, and China dominated the foreign supply.

The rankings for each sector are based on the total volumes expected to be shipped to the target markets in 2015 and 2016. However, when taking steps to further promote exports to these countries, the total import demand and the U.S. share of that import demand must be taken into consideration. For this report, ITA selected seven markets – Canada, Brazil, the Philippines, Mexico, India, the EU, and South Korea – to develop case studies exploring the specific reasons for import demand, and the challenges to expanding exports to these countries.

Challenges Facing U.S. Renewable Fuels Exports

Despite of the enormous success that U.S. ethanol and wood pellet exporters have experienced in recent years, many issues have emerged as obstacles to continued U.S. export growth.

Figure 4: U.S. global wood pellet exports (Million Metric Tons)



Absence of blend mandate (Ethanol): The existence of a policy environment that requires petroleum companies to blend gasoline with ethanol is usually a prerequisite to U.S. ethanol exports. In the case of the regional hubs (UAE, Singapore, etc.) without blend mandates, the low cost ethanol is driving demand for discretionary blending. Ethanol is recognized as an octane booster; if the price is right, a company will voluntarily blend higher amounts with gasoline for better engine performance and lower the overall cost of the finished product. Larger amounts are needed to obtain significant environmental benefits. For a list of blend mandates in each of the 12 markets covered in this report, see Appendix.

Absence of co-firing incentives (Wood Pellets): Similarly, without government incentives for the substitution of wood pellets for coal, oil or gas in the heat and power sectors for environmental purposes, there is no export market for wood pellets. These incentives are usually based on policy goals for higher renewable energy content or carbon reduction. Countries wishing to fulfill these policies, but lacking the natural resources or production facilities to manufacture pellets, are more likely to import them. However, when these incentives are tied to sustainability criteria or local production requirements, U.S. and other foreign suppliers may be negatively affected. This is discussed in further detail below.

Sustainability criteria (Ethanol/Wood Pellets): Both grain-based ethanol and wood pellets face criticism from environmental NGOs and several in the academic community, despite their potential to reduce GHG emissions compared to fossil fuels as well as their ability to reduce air pollution. Concerns have been raised that corn ethanol's GHG reductions are offset by the environmental impact of growing the crops for the feedstock. Based on life cycle analysis, waste-based fuels achieve generally higher reductions of GHG emissions than traditional grain-based ethanol.

For this reason, cellulosic ethanol, using waste residues from forest and agricultural industries, is given preference to satisfy environmental goals with the least amount of controversy both at home and abroad. However, due to higher production costs, cellulosic ethanol lags behind corn ethanol in terms of its commercial profitability. For pellets, the issue has been how to provide concrete evidence of sustainable forestry practices.

As detailed in the country case studies, EU member states are developing sustainability certification regulations in a patchwork manner. Since the U.S. system is structured differently, concerns have been raised as to whether such regulations will cut off trade in wood pellets completely. South Korea is also developing sustainability criteria, for which the impact is yet to be fully understood.

Preference for local production (Ethanol/Wood Pellets): Many countries, such as India, the Philippines, China, and Mexico, state openly in their policies that locally produced ethanol is given a preference over imports. This is generally not an issue for pellets, except in France, because most countries that recognize their limitations with natural resource or production capacity tend to foster a relatively more open import regime.

Knowing the key players (Ethanol/Wood Pellets): U.S. ethanol producers now feel the constraint of how much ethanol can be absorbed in the U.S. market for fuel. At the same time, small and midsize U.S. ethanol producers are now finding their stock is in demand in countries where they have not met the buyers directly. Normally such producers rely on third party

Figure 5: Strategies for Renewable Fuel Markets

Market Characteristic	Potential Export Strategies	Examples
Large U.S. Share in a Large Market	• Focus on meeting as many potential buyers partners as possible	Canada (ethanol) Philippines (ethanol) UK (pellets)
Small U.S. Share in a Large Market	• Evaluate whether lack of market share is due to competitiveness constraints or protectionist barriers • Report any market access barriers to U.S. Government • Find niche opportunities	South Korea (pellets)
Large U.S. Share, but Small Market	• Participate in market development activities • Position company for when market begins to develop	Mexico (ethanol) Japan (pellets)
Large U.S. Share, but At-Risk Market	• Participate in public-private sector dialogues to address policy issues	Netherlands (pellets)

distributors to arrange trade logistics. From a long-term strategic viewpoint, however, market intelligence and business relationships will build a steady trade flow. U.S. ethanol fuel associations are beginning to focus their efforts on assessing overseas demand potential, including a better understanding of the political context in various markets.

Antidumping tariffs in the EU (Ethanol): In February 2013, the EC imposed antidumping duties against U.S.-produced ethanol, leading to a sharp decrease in exports to EU Member States that year. The antidumping duties are being challenged in EU court by U.S. ethanol industry associations.[5] In 2014, U.S. ethanol exports to the Netherlands and Finland were higher compared to the previous year[6], but exports to other Member States were virtually nonexistent. The loss of market share resulting from the antidumping duties was particularly evident in the UK, which still imports over half of its ethanol needs; the U.S. share of that import market went from 58 percent in 2012 to less than 1 percent in 2014.

Leveraging U.S. Government Resources

This report attempts to distinguish not only the priorities of each export market, but also to bring a needed perspective to the relative size and importance of each market.

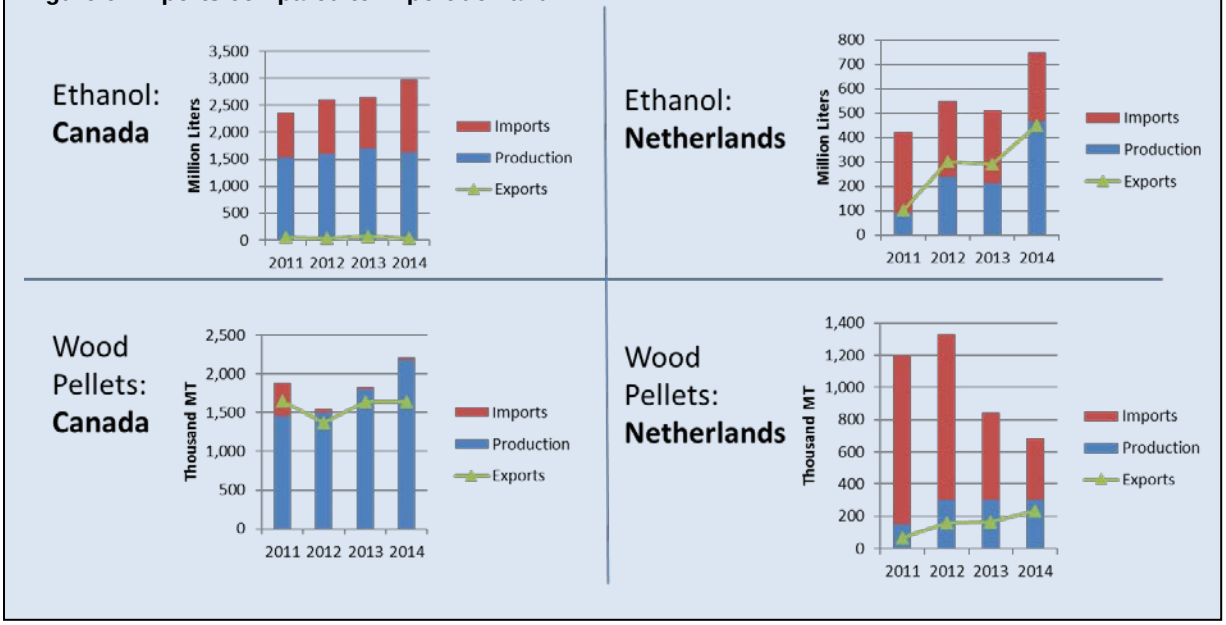
Figure 5 summarizes four types of renewable fuels exports markets and gives a general overview of the types of strategies that could be employed by a company that is trying to expand or begin exporting.

Exporters are encouraged to use the Top Markets report as a tool and a first step in analyzing different opportunities. Following this, exporters can work directly with U.S. government agencies such as the Department of Commerce's International Trade Administration (ITA) and the Department of Agriculture's Foreign Agricultural Service (FAS). These agencies can help exporters connect with buyers and address trade barriers through discussions with foreign governments. They may also organize activities that exporters can participate in for both of these purposes.

Methodology

The renewable energy top markets study was previously conducted twice for internal purposes (in 2012 and 2014), and a public version of the report was released in 2014. This year, coordination between Commerce and USDA was further enhanced by sending a questionnaire to selected FAS posts to collect insights about the regulatory environment of each target market. In total, 17 posts completed the questionnaires including several specifically focused on the wood pellet market that had previously not filed an annual FAS Biofuels Global Agricultural Information Network (GAIN) report.

Figure 6: Exports compared to import demand



In an effort to improve the formula for estimating ethanol and wood pellet exports this year, consideration was given to the reality that certain markets both import and export renewable fuels. Most countries tend to produce as much as they can domestically and then import the remainder. However, when countries also export part of their domestic production, a gap in consumption must be filled. Therefore the import demand can be affected by exports.

Canada and the Netherlands provide two examples of this phenomenon (Figure 6). For ethanol, Canada is very straightforward: with a large nationwide consumption and very few exports, imports compensate for insufficient domestic supply. However, Canada's domestic wood pellet production is focused almost entirely on exports and domestic consumption is low. Imported wood pellets are used for the domestic supply. With the Netherlands, a different pattern is occurring: ethanol is imported, exported, and consumed in-country, while wood pellet imports make up a majority of consumption due to low production levels.

This year's formula, shown in Figure 7, differed from the 2014 *Renewable Energy Top Markets Report* in two key ways.

Import demand: The previous formula was a market share based on the country's consumption. The new formula is a market share based only on the country's import demand for ethanol or pellets. If a country's exports or production levels are expected to increase or decrease, this was taken into consideration when calculating the import demand. The market share for 2015 and 2016 was estimated from the trend lines of the past three years.

Figure 7: Methodology for Renewable Fuels Top Markets

Based on volume, not cost: The rankings for the Renewable Fuels Tops Markets Report will not be calculated based on the unit cost to ship the ethanol or pellets to the export market. While there may be variances in the unit prices, these reflect the logistical costs and therefore have no impact on the bottom line in a practical sense. Also, since it was decided not to combine the two sectors into one list, there is no need to convert the volumes to dollar amounts. The rankings for ethanol are determined by the combined number of liters predicted to be exported in 2015 and 2016 to the target market. The rankings for biomass wood pellets are determined by the combined number of kilograms predicted to be exported in 2015 and 2016 to the target market.

A Few Caveats

Even with its third iteration of analyzing fuel ethanol and biomass wood pellets, and improvements every year, ITA cautions that these rankings are based on estimates and forecasts, as well as historical trade data as reported by exporters to U.S. Customs.

Prior to 2012, the U.S. exporters only selected beverage or non-beverage purposes in the Harmonized System (HS) codes for ethanol. The 10-digit codes for "ethanol for fuel use" (denatured and undenatured) have been used since 2012 by the United States as an extension to the 6-digit HS codes 220710 and 220720. These are distinct from the 10-digit codes for ethanol for non-beverage industrial chemicals. There is a possibility that some U.S. exporters are over-reporting or underreporting their shipments if they do not select the correct code. Another issue is that fuel-grade ethanol may be exported, but it might be used as a non-beverage industrial chemical instead.

As a result of the differences in reporting systems between the United States and other countries as well as difficulties in accurately identifying end use at the time of export, ITA has discovered some discrepancies between the U.S. Census data and the import data reported by other countries. When undenatured ethanol that has been designated by U.S. exporters as "for fuel use" enters a country that does not have a separate system for identifying fuel use, it is impossible to verify whether it is used for its intended purpose without further investigation, which is beyond the resources available for this report. This issue and the countries where it is applicable will be addressed more fully in the Sector Snapshot.

In 2012, the wood pellet HS code was harmonized by the World Customs Organization at 440131 for all countries, so trade data discrepancy issues are not evident with the wood pellet trade data.

Case studies

ITA identified seven countries for in-depth case studies: Canada, Brazil, the Philippines, Mexico, India, the EU, and South Korea. The markets represent a range of countries to illustrate a variety of points – not necessarily the top markets overall.

The case studies describe each country's renewable fuels market and include specific commentary on the competitive position of U.S. exporters. For the EU, wood pellet market information is provided for each of the nine member states that were included in the rankings. Most case studies also include some suggested events in the target market for interested exporters and contact information for the overseas offices of FAS and ITA.

In addition, ITA provides sector snapshots on the fuel ethanol and biomass wood pellet markets. These snapshots provide sector-specific market trends and project export competitiveness in these sectors in both the near-term and mid-term.

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Country Case Studies

The following pages include country case studies that summarize export opportunities in selected markets. The overviews outline ITA's analysis of the U.S. export potential in each market. The markets represent a range of countries to illustrate a variety of points – and not the top seven markets overall.

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Brazil

The outlook for U.S. renewable fuel exports to Brazil is positive in the near term. In recent years, the symbiotic relationship between the two largest ethanol producers in the world has grown stronger, as evidenced by the steady trade in both directions. Recently, Brazilian consumer demand for U.S. ethanol has been increasing as U.S. exports have become more competitive in the Northeastern Brazilian market. However, even if Brazilian production rebounds, robust U.S. harvests -- combined with U.S. federal and state biofuels policies that attract Brazilian ethanol, creating a need for backfill -- will foster additional export opportunities.

Ethanol Rank	Wood Pellet Rank
2	N/A

The United States and Brazil, the top two ethanol producers and consumers in the world, have a robust trade in ethanol. The trade balance fluctuates depending mostly on weather conditions that affect the harvest of the feedstock. In addition, opportunity windows for price arbitrage between ethanol prices in the United States and Brazil shift the balance one way or the other. The international sugar market also represents a key factor given that the sugar-ethanol industry can divert more or less sugarcane to ethanol depending on sugar prices.

In 2014, the United States exported $265 million (424 million liters) in ethanol to Brazil, surpassing the imports from Brazil valued at $158 million (230 million liters) for the first time in three years. A record-breaking corn harvest created an abundant supply of ethanol in the United States and contributed to its cost competitiveness. Brazilian ethanol imports have been declining since 2012 (Figure 1), although Brazil still accounted for nearly 75 percent of total ethanol brought into the United States.

Barring unforeseeable weather conditions, the demand for U.S. corn-based ethanol in Brazil is expected to remain steady, while at the same time Brazilian sugar-cane ethanol will continue to be essential to the U.S. market because it qualifies as an "advanced biofuel" under EPA's Renewable Fuel Standard (RFS) regulations. When the other types of advanced biofuels in this category, biodiesel and cellulosic ethanol, are not in sufficient supply for the RFS requirements, imports of Brazilian sugarcane ethanol could fill this niche in the U.S. market. In addition, California and Oregon have implemented their own state-level regulations to promote the use of advanced biofuels. In fact, given the demand created by these requirements, imports from Brazil were unexpectedly low in 2014.

Market Overview

Brazil is second only to the United States as the world's top producer of ethanol fuels. Brazil's ethanol is produced from sugarcane, rendering the ethanol highly dependent on that crop's price. Additionally, certain ethanol functions as a substitute for gasoline in Brazil, as nearly half of the automotive fleet can run on either ethanol or gasoline.[7]

Although Brazil is a major ethanol producer, it is also a significant market for American ethanol exporters. The

Figure 1: Ethanol Imports from Brazil to the United States (Denatured and Undenatured Combined)

	2012	2013	2014
Value	$ 1,285,829,833	$ 939,624,632	$ 158,459,638
Volume (Liters)	1,736,875,737	1,318,061,827	230,395,535

Source: U.S. Census Data

reasons are twofold: Brazilian consumption of ethanol is extremely high; and consumers are price conscious because they can choose their blend at the pump. In particular, demand in Northeast Brazil for imported ethanol has been strong due to insufficient local production and the higher cost of transporting from Southern Brazil. However, because ethanol production and bilateral trade are closely tied to weather conditions for harvests, projections are difficult. Furthermore, the ethanol market in Brazil is strongly affected by the economic conditions of its gasoline market.[8]

The Brazilian market for ethanol is still more complex, as ethanol comes in two forms: hydrous and anhydrous, meaning with water and without water, respectively. The type of ethanol that certain automobiles can operate on purely is hydrous ethanol, whereas anhydrous ethanol is blended with gasoline according to government blending requirements. Brazil's current blend rate is 27 percent.

Anhydrous and hydrous ethanols require different processing techniques, so the markets for the two products can diverge. Since hydrous ethanol is a substitute for gasoline, low gasoline prices undercut its competitiveness. However, in that environment, the blending requirements will push up demand for anhydrous ethanol, since it must comprise 27 percent of gasoline sold. Gasoline prices can effectively determine the future of the ethanol industry in Brazil, depending on whether Brazil allows hydrous or anhydrous ethanol to retain a foothold in the market.

Government policy has been damaging to hydrous ethanol. In an effort to control inflation, the Brazilian government kept gasoline prices artificially low, preventing hydrous ethanol producers from having a level playing field and forcing a consolidation of the industry as producers broadly suffer losses.[9][10] In a market where drivers with flex-fuel cars have the option of filling up with ethanol beyond the 27 percent blend, the more expensive ethanol is compared to gasoline, the less desirable ethanol is to consumers. As many as 30 ethanol and sugar plants were on the verge of bankruptcy in September 2014.[11]

However, in 2015 the Government of Brazil increased taxes on gasoline and made no price adjustment in response to the collapse of international oil prices. This has been greeted with relief and optimism by the Brazilian ethanol industry. Production is expected to increase, to meet a potential increase in domestic demand. Such fluctuations in taxation policy complicate the demand/supply situation making projections for production, use and trade somewhat difficult.

In the long term, if economic conditions are favorable at a time when Brazilian ethanol production rebounds, it also is likely to make its way into California's low emissions fuel market to satisfy its Low Carbon Fuel Standard. Although it may displace U.S. ethanol, its import also may create a gap in Brazilian supply that U.S. ethanol suppliers can easily backfill. That said, there is no immediate evidence that the recent slowdown of ethanol from Brazil to the United States has negatively affected U.S. export opportunities to Brazil. By the same token, it is difficult to predict whether stimulated Brazilian ethanol production will be used for domestic demand or find its way to the United States.

Challenges and Barriers

Trade friction between the ethanol industries in the United States and Brazil is nearly nonexistent after years of a public tug-of-war over tariffs. The United States dropped its ethanol tariff for most favored nations at the end of 2011 and eliminated the controversial surcharge. According to a resolution by the Ministry of Development, Industry and Commerce (MDIC), Brazil's ethanol tariff will remain at zero until December 31, 2015. If MDIC decides not to extend the zero tariff, this could potentially create a trade barrier at a time when two-way trade in ethanol has become interdependent. One of the reasons for not making a permanent change is purportedly the complexity of altering tariff schedules for the Mercosur trade bloc.[12]

Opportunities for U.S. Companies

U.S. export opportunities will clearly be affected in years that Brazilian production is bolstered by good sugarcane harvests. For example, sugar prices dropped to around 16 cents per pound in mid-2013, spurring ethanol production, where nearly 60 percent of the country's harvest was converted into ethanol.[13] In contrast, a period of drought that drastically affects sugarcane harvests leads to high levels of imports from the United States, such as in 2011, when $1.2 billion worth of U.S. ethanol was shipped to Brazil.

In October 2013, ITA organized a Market Development Cooperator Program in Recife where U.S. ethanol companies met with potential buyers. As a result of the event, U.S. participants strengthened their trade relationships and generated export successes worth reportedly $30 million. U.S. ethanol exports to Brazil in 2014 also were noticeably higher than the previous two years. This suggests that the strategy of making personal business connections, rather than relying on sporadic opportunities through distributors, paid off for the U.S. ethanol industry. The true test lies ahead concerning whether these relationships will endure the collapse of the Brazilian currency, low crude oil prices, and other factors.

Upcoming Fuel Ethanol Events for Exporters interested in Brazil:

- **Ethanol Summit** - June 29-30, 2015 - São Paulo
- **ISO Datagro Sugar and Ethanol Conference,** May 13, 2015, New York, NY

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Canada

Canada will remain the largest market for U.S. ethanol during the foreseeable future. Federal and provincial mandates require more ethanol than the domestic refineries can produce, and the actual percentage of blending nationwide is higher than the minimum 5 percent. Consumption continues to rise with gasoline demand and the domestic capacity remains unchanged, so ethanol imports also are likely to increase. In contrast to ethanol, Canada imports only a small amount of U.S. wood pellets compared to other markets. In fact, the United States imports ten times more wood pellets from Canada than vice versa. Canadian pellet suppliers also compete with U.S. pellet suppliers in Europe, South Korea, and Japan. Despite being a rival in the global wood pellet market, Canada is cooperative in dealing with trade barriers faced by the industry, recognizing common interests with U.S. wood pellet exporters.

Ethanol Rank	Wood Pellet Rank
1	8

Canada has traditionally been a reliable customer of U.S. ethanol. For nine out of the last ten years, Canada has been the top market for U.S. ethanol exports. U.S. exports of ethanol to Canada jumped by over 150 percent in calendar year (CY) 2011 and have increased since then reaching a record $845 million in CY 2014. Trade with Canada is not restrained by tariffs, transportation or language barriers.

In 2013, there was another noticeable upsurge of U.S. exports to Canada, reaching 53 percent of the total exports of U.S. fuel ethanol by the end of that year. This coincided with the dramatic reduction of ethanol exports to the EU market due to EU's imposition of antidumping duties on U.S. ethanol. Since then, the trade flows have rebalanced to other regions, such as South America and Asia, but Canada still captured 40 percent of U.S. ethanol exports in 2014.

Two-way trade in wood pellets is a complicated story by comparison. While Canada does not rank highly compared to other markets in this study, it is worth examining how U.S. and Canadian exporters compete for contracts in Europe, South Korea, and Japan while also cooperating on sustainability certification issues.

Market Overview

Canada's blend mandates have led to success for U.S. exporters. The federal mandate of 5 percent renewable fuel content requires an estimated minimum of 2.2 billion liters of fuel grade ethanol consumption per year.[14] However, the annual production capacity is likely to remain at 1.8 billion liters, which is not enough to meet domestic demand.[15]

Furthermore, statistics suggest that the actual blend rate exceeded the mandated level and is estimated to have reached about 7 percent of the gasoline pool in 2014. [16] This expansion came at a time when ethanol was a significantly cheaper fuel than gasoline, thus encouraging discretionary blending.

By contrast, Canadian wood pellet consumption is relatively small and Canada channels most of its production to overseas markets. Domestic consumption hovered around 200 million kilograms (kg) per year from 2011 until 2014, when domestic production more than doubled to 572 million kg during that time.[17]

According to the Wood Pellet Association of Canada (WPAC), demand can be expected to increase further

in accordance with new regulations to reduce carbon emissions of power plants. Canada has committed to reducing its greenhouse gas emissions by 17 percent by 2020 compared to its 2005 levels. [18] Some Canadian power companies are considering the option of converting some of the current coal-powered plants into co-firing coal plants that use wood pellets.[19] If Canadian utilities began co-firing with 10 percent wood pellets, then the domestic consumption would rise to 6 billion kg per year.[20]

Currently, coal-fired power plants in Canada are not using wood pellets because they are more expensive than coal.[21] Commissioning of new coal power plants has been banned in Canada, and on July 1, 2015, new efficiency requirements for coal plants will come into effect. Plants commissioned after that date must emit less than an average of 375 tons of carbon dioxide per gigawatt hour of electricity produced, which is analogous to the emissions performance of a combined cycle natural gas power plant.[22] Natural gas is expected to replace most of the coal use.[23]

In spite of the limited use of wood pellets in Canada, domestic production of wood pellets in Canada increased between 2013 and 2014. According to the Canadian International Merchandise Trade Database, if Canadian production increased to 100 percent of its capacity, then an additional 1 billion kg of wood pellets could be produced each year. This would bring total production to 3 billion kg per year.[24]

Until domestic demand within Canada is stimulated, global demand will determine how much production increases. Annual exports totaled about 1.6 billion kg in the past two years. In 2014, almost 1 billion kg of Canadian wood pellets were sent to the United Kingdom and approximately 220 million kg were sent to the United States. (Figure 1) Meanwhile Canada also imported 30 million kg that same year with 22 million kg coming from the United States and 7 million kg coming from Norway.

In response to the growing global demand for wood pellets, WPAC started a yearlong wood pellet export initiative on April 1, 2015. The goals of the program include standardizing procedures for determining the environmental effect of burning wood pellets, getting more types of ocean carriers certified to transport wood pellets, and introducing wood pellets into markets that are looking for additional renewable fuels.[25] WPAC is active in promoting Canadian wood pellet use both in Canada and abroad.

Figure 1: Canada's Top Wood Pellet Export Markets in 2014 (kg)

United Kingdom	982,809,144
United States	218,903,102
Italy	204,555,467
South Korea	150,003,940
Japan	61,807,302
Denmark	17,197,480
Singapore	705,037
Brazil	360,000
Belgium	306,200
Taiwan	273,511

Source: GTA

Challenges and Barriers

U.S. ethanol exports do not face any trade barriers in Canada. However, unless the national or provincial ethanol blending requirements in Canada is revised upward, any additional demand for imports will depend largely on the price competitiveness of ethanol. The sudden drop in the price of crude oil and a significantly stronger U.S. dollar over the past 12 months has raised the cost of U.S. ethanol in Canada. The impact on discretionary blending above mandated levels remains to be seen, because U.S. suppliers have some leeway to lower their prices. However, environmental concerns are still a deciding factor for consumers and policymakers. Despite the risk that U.S. exports could slow in 2015, Canada will remain the strongest prospect in this report.

The lack of significant domestic consumption of wood pellets in Canada will hamper any efforts to increase the U.S. market share. At this time, Canada's wood pellets industry is almost entirely focused on exports.

However, wood pellets from both the United States and Canada being shipped in large quantities to European markets are similarly affected by trade-restrictive sustainability certification issues (see the EU case study). As such, being in the "same boat" has led to close coordination between U.S. and Canadian exporters to ensure markets remain open to North American pellets.

Opportunities for U.S. Companies

Provincial policies, rather than increasing the federal mandate, could be the key to growing U.S. exports to Canada. Since environmental concerns have been the key driver of these policies and programs,[26] it may be possible to encourage higher blend rates in Ontario, British Columbia, Alberta and Quebec. These are the most densely populated provinces and thus the greatest consumers of gasoline, and are also provinces very concerned with sustainability and environmental quality.

For example, in the province of Quebec, a cap-and-trade system to regulate GHG emission has been established and is now entering a second phase (as of January 1, 2015) which will now apply to fuel distributors as well. In Ontario, there is a sustainability component calculated for how the ethanol is created that gives the obligated party credits and lowers its obligation. The greener the feedstock and process, i.e., use of corn stover to heat plants that make ethanol, the better the score. U.S. exporters who can leverage this system have a better chance of supplying to the obligated party.

Although U.S. wood pellet exports to Canada are not anticipated to be significant in the near term, one area to monitor closely in the next two years is whether the new emission regulations create more import demand from power utilities for wood pellets.

Upcoming Fuel Ethanol and Biomass Events for Exporters interested in Canada:

- **Canadian Wood Pellet Heating Conference 2016 –** Dates TBD

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European Union

This year's report provides greater depth of analysis for the individual wood pellet markets of the European Union (EU). Each has its own characteristics, although U.S. exports are mainly in demand for the public utility power sector rather than the home heating market. A patchwork of sustainability regulations is beginning to develop, thus requiring closer examination of each market's regulatory process. With regards to ethanol exports to the EU, which used to account for one third of all U.S. ethanol exports, there is very little optimism for the 2015-2016 timeframe. Though not at the same high volumes as in 2012, some U.S. ethanol is being shipped to the Netherlands and Finland, but trade with the United Kingdom (UK) has slowed substantially.

Consumption of ethanol in the EU is expected to remain the same or rise only slightly in the near term, but the U.S. share of imports remains stymied by antidumping duties imposed by the European Commission on U.S. ethanol. Furthermore, sustainability certification requirements under the EU's Renewable Energy Directive (RED) are difficult to meet for most suppliers of corn-based ethanol, as all biofuels used to meet renewable energy goals must provide evidence that they have reduced greenhouse gas emissions by at least 35 percent compared to fossil fuels. This threshold increases after 2017, requiring a verified reduction of at least 50 percent, and at least 60 percent for new installations. Several EU member states have developed national voluntary systems, in addition to the 13 voluntary schemes adopted by the European Commission.

Recently, the EC Parliament passed legislation imposing a 7 percent cap on total field crop biofuels beginning in 2017, modifying the existing RED. Given the double counting scheme that incentivizes waste-stream biofuels and the fact that diesel use in growing while gasoline use is shrinking, biodiesel use will likely increase further while little growth if any is expected for ethanol in the long term.

Although the current mandate calls for 10 percent of the transport fuel of every member state come from renewable sources such as biofuels by 2020, discussions are underway to ultimately remove the specific subtarget for the transportation sector. Such uncertainty over how the EU will meet its own renewable energy goals is also a concern for European producers.

A few EU member states (the Netherlands and Finland) imported U.S. ethanol in 2014, there is no anticipated upsurge during the 2015-2016 timeframe unless the U.S. industry's lawsuit in the EU court overturns the imposition of antidumping duties. And even if this were to happen, U.S. companies will have to weigh the costs of compliance with sustainability requirements and verification schemes compared to pursuing sales in other markets.

U.S. ethanol exports to the UK were particularly strongly impacted by the imposition of the antidumping duties. While U.S. ethanol accounted for 58 percent of all UK imports of ethanol in 2012, the U.S. market share dropped to under 1 percent in 2014 despite the UK's continued dependence on imported ethanol to meet its blending requirements. The UK now gets most of its ethanol imports from the Netherlands, France and Spain.

In contrast to fuel ethanol, the EU will remain by far the largest market for American wood pellets. Demand for wood pellets is increasing as its member states seek alternatives to coal for electricity and heat production. One of the driving factors for the use of wood pellets instead of natural gas is the EU-wide RED, under which renewable energy is to account for at least 20 percent of all energy consumed by 2020.

In 2014, the EU consumed 19 billion kilograms of wood pellets, which amounted to 85 percent of the global market. That year the United States sent $503 million worth of wood pellets to the EU, capturing about 33 percent of the market share there.[27] The UK, the Netherlands and Belgium use the wood pellets predominantly for electricity production and these

Figure 1: Global Export Statistics, 2014
Commodity: 440131 (Wood Pellets)

Reporting Country	Quantity Exported (kg)
USA	4,005,057,299
Canada	1,637,589,402
Latvia	1,248,355,000
Russia	879,007,109
Portugal	749,434,000
Estonia	640,839,000
Germany	627,088,000
Austria	480,854,000
Romania	412,916,000
Lithuania	300,066,000
Sweden	252,793,000
Netherlands	232,279,000
Denmark	217,568,000
Poland	181,710,000
Bosnia & Herzegovina	172,421,011

countries have been the primary EU importers of American wood pellets.[28] Sweden and Denmark use wood pellets for large cogeneration plants and in heating appliances. However, both countries have recently imported most of their wood pellets from the Baltic Region and Russia.[29] Germany, Italy, Austria and France use wood pellets mostly for residential heating and industrial boilers,[30] relying mostly on domestic production and other EU sources to meet their demand.[31]

The large volume of intra-European trade in wood pellets is another distinguishing feature of this market overall. As the table in Figure 1 shows, the U.S. and Canadian wood pellet exporters are competing primarily with exporters in Latvia, Russia, Portugal, Estonia, and Germany. Malaysia, Vietnam and China are the largest exporters in Asia, and therefore they are the primary competitors to U.S. wood pellet exporters in Asia.

Challenges and Barriers

With regards to ethanol, prospects for U.S. exports are poor in both the short term and the long term. As previously noted, there are anti-dumping duties that handicap U.S. ethanol, costs to meeting EU sustainability requirements and verification schemes and other less regulated markets that offer opportunity, current and evolving policies that incentivize the use of biodiesel at the expense of ethanol, and the possibility that biofuel use may decline after 2020. As a result, most U.S. producers will be looking at other markets, particularly Asia. The remainder of this case study will focus, therefore, on wood pellet exports.

The biggest challenge for American exporters of wood pellets will be regulation. The European Commission, the primary regulatory body in the EU, has stated that it is not planning on instituting any Europe-wide regulations on sustainability criteria for biomass before 2020.[32] In anticipation of EU and member state legislation on sustainability requirements for wood pellets, the industry has created standards like ENplus (created by the European Pellet Council), and the Sustainable Biomass Partnership (SBP) to encourage sustainable practices along the supply chain. In 2013, 4 billion kilograms of wood pellets were ENplus certified.[33] In March 2015, the Netherlands announced plans to require all imported wood pellets to come from sustainable sources.[34] It remains to be seen if those sustainability requirements will exclude some American companies from exporting to the Netherlands and whether other EU member states will follow the Netherlands' lead.

Another potential challenge for American exporters of wood pellets will be the relatively low price of oil (for heating) combined with the strength of the U.S. dollar. The President of the European Pellet Association noted these factors when observing that sales of pellet stoves and boilers decreased in the EU during 2014, and that pellets from the United States were also approximately 33 dollars per metric ton more expensive in February 2015 than the previous year. These trends are anticipated to affect large wood pellet sales in the UK and Belgium.[35]

Opportunities for U.S. Companies

The EU will be the largest market for American wood pellets over the next two years. The EU expects demand for wood pellets in heat and power production to be 21 billion kilograms in 2015 with an equal share going to household and industrial use.[36] The United States can supply wood pellets to meet at

least half of this demand. In 2015, this would amount to a trade value of about $600 million.[37]

Wood Pellet Market Overviews

Wood Pellet Ranking 2

Belgium

Wood pellet consumption in Belgium is dominated by large scale power plants that are attempting to meet the EU's renewable energy goals. In 2014, Belgium imported 657 million kilograms of wood pellets of which 64 percent were from the United States. This made Belgium the second largest market for American pellets in 2014.[38]

Challenges and Barriers: From March to July 2014, the Flemish power sector temporarily stopped combustion of wood pellets because the Belgian wood sector argued that pellet production cannibalized its raw material. In August, generation of electricity from wood pellets resumed as a new Belgian decree requires the wood sector to prove the threat to its inputs prior to limiting its use for pellets. This event showed the uncertainty that still exists in the biomass industry around whether or not wood pellets are the most sustainable and business-friendly alternative to other fuels.

Opportunities for U.S. Companies: The new decree that requires members of the Belgian wood industry to prove that domestic wood pellet sources are a threat to their inputs has caused pellet consumers to favor imports, as the raw materials from abroad are not used by the Belgian wood sector.[39] Because of this, and the growing need for renewable energy sources, reliable demand for U.S. wood pellets in Belgium should continue for the foreseeable future.

Wood Pellet Ranking 5

Denmark

Denmark imported 2.1 billion kilograms of wood pellets in 2014. 121 million kilograms of those wood pellet imports were from the United States.[40] The wood pellet market is substantial in Denmark but so far United States companies have not been able to capture a large share of it due to competition from Latvia, Estonia and Russia.

Challenges and Barriers: Although biomass is more reliable for base load or backup power, it competes in Denmark with wind power, which is increasing its share of electricity. Biomass power in Denmark is also highly dependent on government funding and the price of the pellets versus coal. In December 2014, the energy sector came to a voluntary agreement with the Danish Energy Agency that biomass will be sourced from fiber that is certified at the forest-level or that is certified under the SBP standard. Voluntary agreements like this are very common in Denmark and are considered equal to legislation or law.

Opportunities for U.S. Companies: Large power plants using biomass are now supported by subsidies in the form of feed-in tariffs of about 22 dollars per megawatt hour (MWh) (this is approximately 104 dollars per metric ton of wood pellets).[41] The Danish Government has a goal of phasing out coal by 2030 and that could support a further increase in the use of wood pellets. In March 2015, Denmark came one step closer to building a large biomass power plant by choosing a developer for the plant.[42] This signaled Denmark's continued desire to pursue power production using wood pellets. Denmark will remain one of the EU's largest importers of wood pellets for the short to medium term.

Wood Pellet Ranking 11

France

France, along with the UK and Italy, was one of three major EU member states to increase wood pellet imports in 2014 despite low oil prices. It increased its total imports to 136 million kilograms and its imports from the United States to 335 thousand kilograms.[43] The share of industry and of collective residential heating has increased since 2005 and it will keep increasing in the future as a result of national incentive policies.

Challenges and Barriers: There has been some resistance to using American pellets in France. The French Government considers local wood as more environmentally friendly than imported pellets and it wants to develop the domestic wood industry. The potential for U.S. wood pellets in the future will heavily depend on whether the French Government recognizes that ocean freight is substantially more carbon and energy efficient on a per ton basis than trucking. Imported wood used in subsidized heat facilities also must be certified (by the Programme for the Endorsement of Forest Certification or Forest Stewardship Council certifications).[44]

Opportunities for U.S. Companies: According to the U.S. Foreign Agricultural Service in France, large heat production facilities have to use at least 50 percent of wood chips and local wood is favored in subsidized heat facilities. However, electricity and heat production from biomass has grown fast in the last 5 years and it is more and more difficult for energy companies to source local wood.[45] Thus, the market for wood pellets is expected to grow over the next few years and France's large energy demand means it has potential to be a lucrative market for American wood pellet producers.

Wood Pellet Ranking 9

Germany

Germany is the third largest producer of wood pellets in the world after the United States and Canada. It has about 70 production facilities and an annual wood pellet production capacity of 3.5 billion kilograms.[46] It has a huge market for wood pellets, especially for wood pellet companies operating domestically.

Challenges and Barriers: Between 2013 and 2014, consumption of wood pellets stagnated in Germany and imports from the United States decreased.[47] At the International Pellet Conference in February 2015, the decrease in oil price and a mild winter were cited as reasons for this decrease in demand.[48] The German Government also recently removed a tax deduction for energy renovations that makes it more expensive for businesses to convert to using wood pellets for heat.[49] These factors, along with Germany's domestic production capability, will make it difficult for U.S.-based companies to significantly increase their market share.

Opportunities for U.S. Companies: The market for wood pellets is expected to grow in Germany as it increases its use of renewable energy sources. The large amount of wood pellet consumption in Germany will make it a viable option for American wood pellet exporters for at least the short term, even if market share does not increase.

Wood Pellet Ranking 3

Italy

Italy increased its wood pellet imports to 1.9 billion kilograms in 2014. The United States exported 180 million kilograms of wood pellets to Italy in 2014, capturing about 9 percent of the market. Both of those numbers were improvements over 2013 and that trend is expected to continue.[50] About 15 percent of the total biomass installations use wood pellets in Italy and the residential heating industry is the largest consumer of the pellets.[51]

Challenges and Barriers: At the end of 2014, Italy increased the value added tax (VAT) on wood pellets from ten percent to 22 percent. The change is not expected to decrease demand for pellets in the short term, though it may exacerbate the price difference between pellets made in the United States and pellets made elsewhere.[52] The Italian wood pellet market also is fragmented. Pellets are sold in many different types of stores and in different quantities. Italy also is increasing the proportion of ENplus certified pellets that it uses, indicating that sustainability of the supply chain will be important in the future.[53]

Opportunities for U.S. Companies: Italy has a very large market for wood pellets and there has been a recent increase in purchases of pellet boilers. The government has tax deductions in place to encourage buying pellet stoves and a scheme to support small-scale efficiency improvements using ENplus certified biomass.[54] The size of the wood pellet market in Italy and the U.S. companies' increasing market share make it a promising place to export to in 2015 and 2016.

Wood Pellet Ranking 4

Netherlands

In 2014, the Netherlands imported 383 million kilograms of wood pellets which made it the sixth largest importer in the EU. The United States exported 299 million kilograms of wood pellets to the Netherlands, capturing approximately 78 percent of the market.[55]

Challenges and Barriers: In March 2015, the Dutch government announced plans to require all large (>500 hectares) wood pellet producers for the Netherlands to be certified as sustainable by the Forest Stewardship Council (FSC). It plans to gradually require that 100 percent of the forest acreage from which Dutch wood pellets are sourced be sustainable. It remains to be seen if those sustainability requirements will exclude some American companies from exporting to the Netherlands but long term contracts will be more difficult to secure and other countries in the EU may follow the Netherlands' lead. As of today, the United

States can only produce half a million metric tons of FSC certified pellets.

Opportunities for U.S. Companies: The dominant market share for U.S.-based wood pellet companies can be expected to continue in the short term as the Netherlands has committed to using biomass in heat and power to reach renewable energy goals across all sectors. Legislation requiring 100 percent sustainability of wood pellet sources will not be fully implemented until 2020, after which U.S. exports are uncertain.

Wood Pellet Ranking 7

Sweden

Sweden is the second largest producer of wood pellets in the EU. However, production has stagnated since 2011 as competitive imports from the Baltic countries and Russia have increased.[56] U.S. companies had approximately 6 percent of the market share of imports in Sweden in 2014, which amounts to exports of 29 million kilograms of wood pellets.[57]

Challenges and Barriers: American companies wishing to export to Sweden will have to compete with cheap wood pellets that are being imported from Russia and the Baltic states. Production in those areas is increasing and the value of the dollar along with transportation costs will make it difficult for U.S.-based companies to compete.

Opportunities for U.S. Companies: Sweden is targeting 100 percent renewable energy use by 2020 so it is expected to continue to utilize large amounts of wood pellets for heat production.[58] American companies have an opportunity to increase exports to this large wood pellet consumer market.

Wood Pellet Ranking 1

United Kingdom

The United Kingdom will continue to be the largest market for wood pellets within the EU for the foreseeable future. In 2014, the UK consumed 6.8 billion kilograms of wood pellets.[59] That number is expected to increase to 7.75 billion kilograms in 2015 and to 8.7 billion kilograms in 2016.

In the UK, the use of wood pellets in power plants is driven by the interaction of three policies:

- The Renewables Obligation(RO), which requires until 2027 that licensed UK electricity suppliers source a specified proportion, which is set at the beginning of each year and increased annually, of the electricity they provide to customers from eligible renewable sources;
- The EU's Industrial Emissions Directive, which created a legally binding standard for sulfur dioxide emissions, among other things, and is set to be implemented on January 1, 2016; and
- The Carbon Price Floor, which disincentivizes the use of coal in coal-fired power plants.

On August 22, 2013, the UK's Department of Energy and Climate Change (DECC) announced the release of its final guidelines, which stakeholders within the United States viewed as achievable based on current practices. The UK announced that the guidelines' sustainability criteria will be enforced starting in April 2015 and that it would not revise them until 2027 at the earliest. Drax, which provides electricity for seven percent of the UK, is continuing its conversion to wood pellets. It has signed contracts with U.S. suppliers and is expanding its own pellet production in the United States.[60]

Challenges and Barriers: The UK's Renewables Obligation program states that utilities are required to assess the sustainability of the fuels that they use and publish an annual report.[61] Thus far, this obligation has not prevented American wood pellet producers from being able to supply in the UK market. Currently, the EU is investigating whether or not UK subsidies given to the Lynemouth Power Station, one of its largest power producers, for the use of wood pellets violate EU laws.[62] Some American and European NGOs have supported the investigation because of fears of deforestation. If the subsidies are found to be against EU law, then the UK may reconsider large amounts of its funding for wood pellets and coal plant conversion. This could cause a large drop in demand for American wood pellets.

Opportunities for U.S. Companies: The largest consumer of wood pellets in the UK, Drax, has a coal plant that provides 7 percent of the UK's electricity. Drax will convert its third generating unit out of six at this facility into a biomass fueled unit during the next year.[63] This project and similar ones across the UK will drive demand higher in the short term. The market share of wood pellets from companies based in the

U.S. compared to all other foreign suppliers has increased every year since 2011 and it was 61 percent in 2014.[64] This trend, coupled with the expectation that the UK import market will continue to be more than twice as big as Denmark, the next biggest importer, makes it the most important market for American wood pellets. However, it is anticipated that the market could plateau in 2017.

Upcoming Biomass Events for Exporters interested in the EU:

- **AEBIOM Bioenergy Conference** –May 4-5, 2015 – Brussels, Belgium
- **International Pellet Workshop** – June 9, 2015 – Cologne, Germany

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India

The Government of India's commitment to ethanol blending is clear, and India has the capacity to fulfill its mandate in years of surplus sugar production. The main issue is how to balance incentives for the sugar mills and the Oil Marketing Companies (OMCs). The turmoil in policies – and the intractable yet self-inflicted infrastructure issues – make India a wild card in the rankings. On the current trajectory, India could be the fourth largest destination for U.S. ethanol in the next two years based on volume. Or, the fuel ethanol exports to India might get diverted into the non-beverage ethanol category (industrial).

Ethanol Rank	Wood Pellet Rank
4	N/A

As U.S. ethanol producers turn to Asia as a developing export market, India has been in the spotlight for the difficulties it faces in reaching its ambitious blending goals. While on the surface the Government of India's support for ethanol has been persistent over the years, India also has struggled to balance the incentives for the producers and the blenders.

U.S. exporters will likely fill the gap between the supply and the demand, and appear to be doing so at least indirectly. However, the complexities of India's market may require a more nuanced approach than the approach for the higher ranked countries in this year's Top Markets Report (Canada, Brazil, and the Philippines).

Market Overview

According to India's National Policy on Biofuels (2009), renewable fuels are encouraged for motor vehicles, targeting a five percent blending rate for ethanol. Under the Ethanol Blending Program (EBP), the state-owned OMCs are subject to this requirement and domestically produced ethanol takes priority over foreign-produced ethanol.

However, the OMCs have struggled to obtain the ethanol supply needed for the mandate. The many benefits of ethanol are recognized – including environmental reasons and economic considerations such as cutting the deficit or reducing India's dependence on imported crude oil. However, many structural limitations have prevented the EBP from reaching its goal of a five percent blending rate. In 2014, 13 states increased blending rates to an estimated 2.1 percent and this will increase to 2.5 percent by the end of 2015.[65] The Government of India has repeatedly stated that it would like this rate to be increased to 10 percent.

The Government of India is making various attempts to get around the obstacles. In December 2014, a price fixing scheme for fuel ethanol procurement was introduced.[66] However, according to news reports, this has backfired for suppliers that have high transportation charges.[67]

Furthermore, in February the Government approved the long-awaited export subsidy for raw sugar, but with a condition attached—those mills that produce alcohol must offer at least 25 percent of their annual production to OMCs in order to receive the subsidy. This policy also may have unintended consequences for mills that do not make both products.

Challenges and Barriers

As mentioned, one of the most significant obstacles for U.S. ethanol exporters is that imported fuel is not allowed for blending with gasoline unless government owned petroleum companies float an expression of interest/global tender and ethanol exporter bids are competitive with domestic prices. Despite this, U.S. fuel ethanol exports to India jumped from 31 million liters in 2013 to 155 million liters in 2014, partly as a

result of a particularly large shipment of undenatured ethanol in November 2014.[68]

Similar to some other markets, industry observers say that it is possible that these exports, which are designated for fuel use, are actually repurposed once they arrive at their destination. In fact, some have theorized that due to the requirement for fuel ethanol to be domestically sourced, these exports might be substituting for industrial ethanol. Assuming that is the case, India was included in this year's report because blend rates and insufficient domestic supply are indirectly driving the demand for U.S. ethanol. Further analysis is required to verify this.

Transportation is another area that needs improvement. State level procedures that treat inter-state movement of ethanol as "imports and exports" are widely viewed as impediments.[69] The Government of India's Transportation Minister is pushing for measures to address this.[70]

Opportunities for U.S. Companies

The challenge for U.S. companies is exploring business relationships in a complex and fragmented market, despite India's top-down approach to biofuels policies. The extent to which India's ethanol production can be supplemented with imports remains to be seen. In years of surplus sugar production, India should have no problem meeting its goals.[71] However, other impediments at the state level need to be fully resolved in order to reach 5 percent blending rate or the ultimate 10 percent target. These policy mandates appear to be aspirational rather than firm, making it difficult to predict whether U.S. export growth is possible.

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Mexico

Although the Government of Mexico has established the legal framework for the commercial use of biofuels, the state-run oil company, Petróleos Mexicanos (PEMEX), did not have a successful bid for domestically produced biofuels until March 2015. A relatively small but steady supply of undenatured U.S. fuel ethanol has been shipped to Mexico for the past several years, although it is disputed whether this is repurposed or blended into the gasoline pool. With recent energy reforms, competitors are contemplating entering the fuels market or importing gasoline by 2017, increasing the number of potential buyers. U.S. producers should position themselves to take advantage of these new opportunities.

Ethanol Rank	Wood Pellet Rank
5	N/A

Despite its proximity and the ease of trade with the United States as a NAFTA country, Mexico has not been a large market for U.S. ethanol. The situation is made more complex by sugar trade regulations between the two countries and the monopoly by state-run oil company PEMEX, which has been delaying its implementation of ethanol blending despite government biofuels policies. The year 2015 may be a turning point, however, and the U.S. producers who are interested in increasing their market share in Mexico are paying keen attention to recent developments.

Market Overview

Mexico produces non-fuel ethanol as a subproduct of sugarcane milling. The few operational ethanol distilleries in Mexico have been supplying ethanol for alcoholic beverages and pharmaceutical industries. Sugarcane producers are aware that increasing the ethanol blend could help reduce the country's mounting sugar surplus.[72]

In an attempt to stimulate domestic production of fuel ethanol, the Government of Mexico launched an Ethanol Introduction Program in December 2011. It sets dates and minimum volumes for blending ethanol with gasoline, gradually increasing until 2016.

According to FAS, gasoline sold in Mexico and imported from the United States reportedly contains ethanol, although this is not verifiable with the trade statistics. PEMEX also imports methyl tert-butyl ether (MTBE) and tert-amyl methyl ether (TAME) mixed gasolines. The purchasing decision is made based on price. The Government of Mexico has targeted 6-10 percent blending rate, but no mandatory blending rate has been established.[73]

In March 2015, PEMEX announced that it will begin selling E6 (5.8 percent) ethanol-blended gasoline in selected cities in the Mexican states of Tamaulipas, San Luis Potosi, and Veracruz. It awarded four 10-year contracts to Mexican companies that will supply PEMEX with as much as 123 million liters of ethanol per year. PEMEX will invest about $58 million to build the necessary infrastructure.

The energy reforms enacted in 2014 likely put pressure on PEMEX to finally implement its blending program, after many years of uncertainty and failed bids. Beginning in 2017, companies that operate new stations not affiliated with PEMEX will be able to import gasoline, and in 2018, gasoline prices will be liberalized.

Challenges and Barriers

The Government of Mexico's policies that encourage domestic fuel ethanol consumption have hampered efforts to increase exports to Mexico. PEMEX was accused by domestic suppliers of setting the price of the bids too low for sugarcane based ethanol, which costs more to produce than corn-based ethanol.[74] However, energy reforms seem to have broken the logjam. The next two years are critical for U.S.

exporters to establish business relationships in Mexico with new competitors.

Opportunities for U.S. Companies

Between the years 2012-2014, when U.S. Census Data recorded fuel ethanol exports separately from non-beverage (industrial) ethanol exports, the volume of fuel ethanol shipped to Mexico remained between 80 and 100 million liters (mostly undenatured). Whether these exports are repurposed or blended into the gasoline pool is difficult to verify, although the official government policy favors only domestic ethanol consumption. Industry observers are cautiously optimistic that the launch of PEMEX's program, although ostensibly awarded to domestic suppliers, could create more opportunities for U.S. ethanol suppliers due the lack of ethanol processing infrastructure in Mexico.[75] In particular, by selecting the E6 blend, PEMEX may be setting a precedent that will be adopted nationwide by all retailers of gasoline.

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Philippines

Imported ethanol is expected to satisfy at least half of the domestic demand in the Philippines for the next several years while domestic production capacity catches up. As fuel consumption continues to increase overall due to economic expansion, it will be a challenge for the Government of the Philippines to spur enough investment to cover its ambitious policy goals for ethanol. Exporters should focus on strengthening their personal relationships with Philippine buyers. Building on their recent success, U.S. ethanol producers will be well positioned in the long term if blend mandate is increased as planned.

Ethanol Rank	Wood Pellet Rank
3	N/A

Following the implementation of a 10 percent blending mandate in 2011, U.S. ethanol exports to the Philippines have skyrocketed from 12 million liters in 2012 to 256 million liters in 2014. Strategic export promotion activities within the next two years can help ensure that this temporary phenomenon becomes a steady flow of trade.

Although the Philippine Government prefers domestic ethanol to meet its domestic demand, and capacity is slowly building, it has had little choice but to rely on imports. When Thailand increased its own blending mandate to 20 percent, fuel ethanol from Thailand was used for its domestic supply instead of being exported to the Philippines. This created an opening for U.S. producers at an opportune time, as they were adjusting to the decrease in exports to the EU due to antidumping duties.

The potential competition for market share with other regional ethanol producers remains, but economic and historic ties between the United States and the Philippines could help tip the balance. The affordable price of U.S. ethanol also is an advantage, particularly given the 11 percent tariff rate.

Market Overview

The Philippines was the first country in Southeast Asia to enact biofuels legislation. Blend rates have been gradually increased since 2007, ending with a ten percent ethanol requirement in August 2011. However, meeting this target with domestically produced ethanol has been a challenge due to the inadequate capacity of existing sugarcane distilleries, low productivity, and high production costs.

Even with several new producers starting operations in 2014, and the doubling of production, domestic output still fulfilled barely half of the demand.[76] The fact that oil companies are currently importing the bulk of their ethanol to comply with the Philippine Government's requirement has angered some who would like the Philippines to be less dependent on imported fuel.[77]

Some sources say that fuel use will increase as the population and economy continue to expand.[78] As gasoline demand increases, the amount of ethanol required to meet the blend mandate also will grow. The Philippines Department of Energy also has indicated that it would like to increase the blend rate even further, to 20 percent by 2020. At least 15 additional plants with a 30 million liter capacity each would be needed to meet this requirement.[79]

The difficulties in reaching its goals are related to the Philippines' low sugarcane yields compared to other Asian countries. Philippine ethanol production utilizes sugarcane and molasses for its feedstock, and damage to the crops from Typhoon Haiyan further reduced production levels in 2013.[80]

Challenges and Barriers

While U.S. exporters have enjoyed undeniable success in the Philippines in 2013 and 2014, given the preference for domestic ethanol, there is no guarantee that exports will continue at the same high levels. The

number of domestic producers is growing and there is still competition from regional sources. Rather than taking advantage of ad-hoc opportunities, it is important for exporters to nurture long-term relationships with buyers.

Another hurdle is the 11 percent tariff rate, which consists of 10 percent imposed on all ethanol imports, and an additional 1 percent imposed on any imported ethanol that will be used specifically for the Philippines' Fuel Ethanol Program. As long as U.S. ethanol remains competitively priced, this should not be a major issue.

One additional challenge is the congestion in Manila ports that slows the movement of goods and adds extra costs.

Opportunities for U.S. Companies

Ultimately, if the Government of the Philippines follows through on its plan to increase the blend rate, it will have to accept the reality of imports – and the U.S. ethanol producers should position themselves to provide a steady, affordable supply.

Because infrastructure investment will be limited in the short term, ITA expects the Philippines to continue being one of the top destinations for U.S. ethanol in 2015-2016. Producers and exporters should seek opportunities to visit the Philippines to gain first-hand knowledge of the market and develop business relationships.

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South Korea

South Korea represents the best Asian opportunity for U.S. wood pellet exporters. Compared to regional competitors such as Vietnam and China, as well as our neighbor to the north, Canada, the U.S. market share is small. However, there is the potential to expand this share if new South Korean certification guidelines prohibit rice in the wood pellets, which has been an issue for Southeast Asia suppliers. Additionally, exporters must navigate a tendering process where wood pellets are purchased by biomass utilities that are wholly owned subsidiaries of Korea Electric Power Corporation (KEPCO), which is owned by the Government of South Korea. U.S. pellet exporters should leverage trade promotion resources that could showcase the sustainable forestry practices in the United States as well as the high quality of U.S. wood pellets generally.

Ethanol Rank	Wood Pellet Rank
N/A	6

The market for wood pellets as biomass in power plants has expanded immensely over the past three years in South Korea, although it has a forest product self-sufficiency rate of only 6 percent.[81] As a result, imports from a variety of sources have increased at an unprecedented rate. From 2013 to 2014, imports quadrupled, from 485 million kg to 1.85 billion kg. In 2014, the United States shipped 57 million kg of wood pellets to South Korea, but South Korea's top suppliers were Vietnam, Canada, China, Malaysia and Thailand (Figure 1).

With such a large market, even the U.S. market share of 3.35 percent is a significant volume. U.S. exporters would like to capture a larger share, but need to overcome procurement barriers as well as impending sustainability certification guidelines.

Market Overview

The increase in South Korean wood pellet use is closely correlated to recent policy changes. Through the Renewable Portfolio Standard (RPS), in effect since January 2012, the South Korean government mandates that state-owned and independent power utilities with a capacity over 500 MW generate a certain percentage of their energy production from renewable sources annually. The 17 companies that have this obligation in 2015 face a penalty if they do not meet the requirement by the end of the year.[82] The RPS quota increases gradually, from 2 percent in 2012 to 10 percent in 2024.[83]

Since the introduction of the RPS, many companies have decided to focus on wood pellets for heat and power production since the conversion from coal is relatively easy. The South Korean market also has prioritized obtaining the lowest priced wood pellets possible.[84] The solution has been implemented so widely that the South Korean government is considering a co-firing cap that would reduce the import of wood pellets from overseas and encourage its power suppliers to use other renewable energy resources such as solar power or wind power.[85] As a result, industry experts anticipate that the rapid expansion of the South Korean wood pellet market to slow down.[86]

Challenges and Barriers

The competition for the wood pellet market in South Korea is formidable. Between 2012 and 2014, Vietnam's share of the wood pellet market rose from 24 percent to 40 percent and Canada's share rose from 2 percent to 19 percent (taking advantage of Canadian west coast facilities).[87] The U.S. pellet producers, who are very successful in Europe, could be facing a number of obstacles in South Korea, including offering a competitive price, coordinating logistics from the east coast of the United States, and difficulty navigating the procurement process. Since the power

Figure 1: South Korea Wood Pellets: Top Import Sources, 2014 (kg)

Vietnam	742,793,847
Canada	344,260,851
China	287,062,608
Malaysia	168,335,551
Thailand	110,752,204
Indonesia	62,728,621
United States	61,976,597
Russia	34,755,932
Australia	26,751,165
Japan	4,290,093

Source: GTA

utilities in South Korea are government-owned, wood pellets are subject to a cumbersome tendering process.[88]

In a recent tender for wood pellet contracts, South Korean utilities indicated they want high quality pellets that do not have rice mixed in them.[89] Some exporters in Southeast Asia have allowed small amounts of rice in their wood pellets, which have a negative effect on the boiler equipment in the power plant. As a result, there will be a certification process for wood pellets imported into South Korea. This may be implemented under sustainability regulations for the timber industry. In the meantime, to potentially deter usage of pellets mixed with rice husks, power generation facilities are checking the quality specification of the imported pellets to see if the commodities fall under the low quality rice type pellets.[90]

Of the five thermal power generating companies, each company's Invitation to Bid (ITB) can have different quality specification requirements, accordingly to their specific demand and need at that time. If an importer or supplier meets the minimum quality specification for the specific ITB, one of the most important factors, if not the most important factor, taken under consideration is the 'competitive price' relative to the calorific value.[91]

Opportunities for U.S. Companies

Consumption of wood pellets is expected to continue increasing in South Korea during the next two years, rising from 2.3 billion kg in 2015 to 2.6 billion kilograms in 2016.[92] Domestic production is not expected to increase during that same time period. Therefore, wood pellet companies in the United States that meet certification requirements for sale in South Korea have an opportunity to take advantage of this government-backed demand for wood pellets. However, the details of the certification system are not clearly understood at this time.

Upcoming Biomass Wood Pellet Events for Exporters interested in South Korea:

- Biomass Pellets Trade & Power - Sept. 14-17, 2015 - Seoul

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Sector Snapshots

This section contains sector snapshots that summarize U.S. renewable fuels export opportunities in each subsector. The overviews outlines ITA's analysis of the export potential, providing subsector rankings and describing the different types of markets that U.S. exporters must sell into. Finally, each snapshot offers commentary on the relative competitive position of U.S. suppliers.

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Sector Snapshot: Fuel Ethanol

As more countries mandate the blending of ethanol with gasoline to reduce greenhouse gas emissions in the transportation sector and enhance energy independence, new export opportunities are developing for U.S. fuel ethanol. In terms of total annual volume, the United States was the top exporter of fuel ethanol in the world in 2011 and 2014, and in 2013 essentially shared this distinction with Brazil. Europe was the second largest market for U.S. fuel ethanol from 2010-12, but in the past two years sales to Europe diminished sharply due to the imposition of duties. U.S. fuel ethanol exports have shifted to other markets, particularly Asian countries such as the Philippines and India. However, Canada and Brazil are expected to remain the leading markets for the near term.

Nearly all ethanol is made through a traditional sugar fermentation process with a limited set of biomass-based raw materials (feedstocks), principally corn, other coarse grains (rye and barley), wheat, sugar cane, or sugar beets. A small quantity of ethanol is made via "advanced" conversion technologies (primarily lignocellulosic biomass biochemically converted to alcohols) using wood and agricultural residues (waste streams), municipal solid waste, or dedicated energy crops like popular trees, switch grass, giant cane or energy sorghum.

Roughly 90 billion liters of fuel ethanol was produced annually in 2013-2014.[93] Ethanol trade is growing throughout the world as countries build domestic use through mandates and taxation policy. These policies are motivated by desire to improve energy security by lowering dependence on imported fossil fuels, the need to reduce greenhouse gas emissions or air pollution, and support rural economies.

Overview of Global Export Market Opportunities

Most ethanol consumed in the world today is produced domestically. However, many countries do not have the full production capacity to meet their needs. Despite this, sometimes governments prohibit or impose limitations on the use of foreign fuel ethanol in order to protect their domestic industry. Other times their blend mandates are adjusted according to the domestic capacity available every year. Some countries, such as India and Mexico, have a desire to increase the blending of ethanol with gasoline but infrastructure or political problems prevent their local industry from growing.

Fuel ethanol use has become widespread and the U.S. ethanol industry exports to every region of the world, including to the European Union, where U.S. ethanol exports have faced antidumping duties since 2013. However, for purposes of this report, seven significant markets were not included in the rankings because they were not correlated with domestic biofuels policy,

Figure 1: Fuel Ethanol Exports
2015-2016

Rank		Country
Strong Prospects	1	**Canada** *Large Market, Large Share*
	2	**Brazil** *Large Market, Large Share*
	3	**Philippines** *Large Market, Large Share*
Less Certain Export Growth	4	**India** *Small Market, Large Share*
	5	**Mexico** *Small Market, Large Share*
	6	**Netherlands** *Small Market, Large Share*
	7	**Jamaica** *Small Market, Large Share*
	8	**Peru** *Small Market, Large Share*
	9	**Finland** *Large Market, Small Share*
Significant Obstacles	10	**China** *Small Market, Large Share*
	11	**Colombia** *Small Market, Large Share*
	12	**United Kingdom** *Large Market, Small Share*

Figure 2: Ethanol Regional Hubs

Country	Region Served	2014 U.S. Fuel Ethanol Exports (L) – U.S. Census Data
UAE	Middle East	258,719,200
Tunisia	Africa	79,393,900
Singapore	Asia/Oceania	43,305,000

the most predictable driving factor. Nevertheless, those markets must be noted as additional opportunities.

Looking at the trade data for U.S. exports in 2012-2014, several markets stand out even though they do not have blend mandates (Figure 2). For these markets, to which we will refer as "regional hubs," it is assumed that the ethanol has a secondary destination. The reasons are varied. The U.S. –produced ethanol may be blended at a refinery and shipped out as a gasoline/ethanol blend to other markets in the region (e.g., the UAE).[94] It is also common to have "discretionary blending" for octane boosting.

Four other markets that saw significant exports in 2014 were not included in the rankings (Figure 3). After some analysis, it was determined that fuel ethanol in Nigeria was in demand mainly for a cooking stove program, not for transportation. Although there is a blend mandate, the Nigerian government encourages domestic ethanol to be used. Since there is no significant ethanol production in Nigeria, it is unlikely the Nigerian government will meet its goal. In the case of Panama, ethanol exports were initially promising in 2014 (and accounted for nearly 100 percent of Panama's import demand) but have been left in limbo due to a political scandal that caused the blend mandate to be scrapped indefinitely. For U.S. exports to Spain, the ethanol remains within a special trade zone for blending and then is sent to North Africa instead of fulfilling its own mandate.

Finally, the case of South Korea is still unclear and deserves continued monitoring. ITA decided to exclude South Korea from the 2015 Top Markets fuel ethanol ranking despite recently increased export activity. The records indicate that over 125 million liters (worth $81 million) of U.S.-produced fuel ethanol was delivered to South Korea in 2014, compared to only 16 million liters the previous year and 29 million liters in 2012. This sudden surge has no easy explanation, given that South Korea has no blend mandate and the public opinion is against ethanol from food crops. According to most industry observers, South Korea is only importing ethanol as an industrial chemical. It may be possible that undenatured ethanol for fuel use could be repurposed for bioplastics manufacturing, although there is a separate trade code for ethanol for non-beverage use.

Despite several exclusions from the rankings, and the downturn in U.S. exports to the EU, ITA identified twelve markets for this report. The countries near the top of the rankings are strong prospects. Those in the middle of the rankings are less predictable in the near term but still expected to be significant buyers of U.S. fuel ethanol. For countries towards the bottom of the rankings, such as China, Colombia, and the UK, any efforts made to increase exports will be an uphill battle, although some trade relationships already exist.

Figure 3: Other Notable Markets

Country	Reason for not including in rankings	2014 U.S. Fuel Ethanol Exports (L) – U.S. Census Data
South Korea	Majority is undenatured fuel-grade ethanol being used mainly as industrial ethanol (e.g., bioplastics)	125,493,900
Spain	Using Free Trade Zone; Not entering mainland for consumption	70,305,300
Nigeria	Ethanol is popular for special biofuels cooking stove program rather than blend mandate	38,251,700
Panama	Suspended the blend mandate; uncertain if/when will resume blending	7,993,500

Export Opportunities in the Near-Term

Background information about ethanol production, consumption, import/export, and U.S. market share is detailed in the case studies for Canada, Brazil, the Philippines, India, and Mexico.

Each market is at various stages of development and levels of openness to U.S. exports. The Philippines, for example, has such an immediate need that U.S. producers should meet with active importers as soon as possible. Mexico, on the other hand, will see the liberalization of gasoline sales by 2017, so meeting with potential competitors to the government-owned monopoly PEMEX would be a more suitable approach.

India is a more complicated case, as the fuel ethanol exports are only indirectly contributing to the domestic 5 percent mandate. Indian policy prohibits the use of imports as fuel, but imports can backfill industrial use demand and free up more domestic supply for fuel use. Some policymakers would like to see a 10 percent blend of ethanol. However, India's ethanol is produced from sugar cane, which can be subject to unpredictable fluctuations. More details about the ups and downs of India's biofuels policy environment are provided in the case study.

Planning for the Long Term

The unpredictability of factors that affect U.S. ethanol exports – such as weather, prices, and exchange rates – should not deter long term strategic planning. As commercial scale "second generation ethanol" production gets off the ground in the United States, U.S. "conventional ethanol" producers will continue to look abroad for opportunities. Regardless, it will be an affordable option in countries that may not have the level of economic development necessary for either their own domestic production or to import expensive advanced ethanol.

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Sector Snapshot: Biomass Wood Pellets

Substitution of coal with biomass in several EU Member States, South Korea, and Japan to meet carbon emission targets is driving demand for biomass pellets. This also has spurred U.S. and European investment in several new Southeastern United States pellet mills. Asian markets remain largely untapped by U.S. exporters. However, South Korea's policy mandate to escalate its use of biomass and a desire for high quality pellets have resulted in a dramatic increase of U.S. pellet exports to Asia over the past two years.

Biomass power uses organic matter (wood, agricultural waste, etc.) or inorganic matter like municipal solid waste to create electricity or heat. Wood pellets and wood chips are the most commonly used fuel in biomass power plants. Pellets are usually created from forest thinning, scraps, and other residues of low economic value in the timber industry. The compression of the wood creates a higher BTU than typical biomass sources.

Overview of Global Export Market Opportunities

Over the next two years, ITA expects biomass pellet consumption in the top ten U.S. export markets to average 24 billion kg annually. The United Kingdom, which continues to ramp up its use of biomass power, will account for over one-fourth of the total consumption globally and will represent the largest pellet market for the United States.

South Korea will continue being the largest consumer in Asia, and will look to foreign suppliers for nearly all of its wood pellet needs. Japan's market is growing but the import level is less than half of consumption.

In terms of volume, the United States is firmly positioned as the largest exporter of wood pellets in the world. (Figure 2a) However, it is notable that in 2014, other exporters were rapidly gaining market share. This is particularly notable in Southeast Asian countries (Figure 2b), which have been responding to increased demand in South Korea and Japan. Although Vietnam's 2014 trade data is not included on this table, the wood pellet imports reported by Japan and Korea combined in 2014 exceeded 745 million kg.

Figure 1: Biomass Wood Pellet Exports
2015-2016

Rank		Country
Strong Prospects	1	**United Kingdom** *Large market; large share*
	2	**Belgium** *Large market; large share*
	3	**Italy** *Large market; large share*
Less Certain Export Growth	4	**Netherlands** *Small market; large share*
	5	**Denmark** *Large market; large share*
	6	**South Korea** *Large market; small share*
	7	**Sweden** *Large market; small share*
	8	**Canada** *Small market; small share*
Significant Obstacles	9	**Germany** *Large market; small share*
	10	**Japan** *Small market; small share*
	11	**France** *Small market; small share*

The Pellet Export Opportunity in the Near-Term

The results showing mostly European countries as top prospects for U.S. wood pellet exports are in line with expectations. According to Global Trade Information Services, the United States was the leading exporter of wood pellets to the EU in 2014, capturing 58 percent of the EU's import market.[95] The top EU markets for U.S. pellet exporters were the UK (71 percent share of EU imports), Belgium (10 percent), and the Netherlands (5 percent). EU imports have steadily increased in the last three years, with imports of 4.5 million metric tons (MT) in 2012 and imports of 6.6 million MT in 2014.

Figure 2a: Top Exporters of Wood Pellets (kg)

	2012	2013	2014
USA	1,898,124,809	2,882,516,750	4,005,057,299
Canada	1,369,181,165	1,640,347,477	1,637,589,402
Latvia	901,960,000	1,055,929,000	1,248,355,000
Russia	728,382,377	740,691,523	879,007,109
Portugal	575,450,000	776,743,000	749,434,000
Estonia	430,424,000	623,175,000	640,839,000
Germany	848,778,000	720,228,000	627,088,000
Austria	476,312,000	482,799,000	480,854,000
Romania	276,701,000	457,488,000	412,916,000
Lithuania	264,998,000	321,479,000	300,066,000

Figure 2b: Asian Wood Pellet Exporters

	2012	2013	2014
Vietnam	0	132,397,713	N/A
Malaysia	0	81,672,135	168,558,621
China	2,727,573	3,293,467	163,209,250
Thailand	631,435	18,158,929	110,826,307

Source: GTA

Growth in imports to the EU is expected to continue, with projections ranging between 25 and 70 million MT by 2020. Germany and France in particular have large markets for wood pellets with demand expected to rise in the near term. They have relied on domestic production so far, but will need to increase imports to meet increasing demand created by carbon emission reduction policies. For in-depth analysis of EU markets for wood pellets, please see the EU case study.

In Asia, South Korea is likely to be the largest export opportunity for American exporters in the near term. In 2014, U.S. wood pellet producers exported nearly 61 thousand MT to South Korea. However, this only amounted to about three percent of the Korean market.[96] According to the government's targets, South Korea's wood pellet demand is projected to grow to 5 million MT by 2020. It also relies heavily on imports for forest products in general, with a forest products self-sufficiency rate of only 6 percent.[97] By comparison, a majority of the wood pellets used in China are expected to be manufactured in China, making import opportunities minimal despite the potential large size of the market.

While it may be difficult for U.S. suppliers to compete with Southeast Asian suppliers on the basis of price, the value proposition may be in the quality of the pellets. South Korea is starting to implement guidelines for wood pellets because pellets from Vietnam have been found to contain trace amounts of rice, which causes mechanical issues in the boilers of the biomass power plants.

Shipments of U.S. wood pellets to the United States' North American Free Trade Agreement (NAFTA) partners are surprisingly low. Canada's use of wood pellets has yet to catch up with production. If Canada expands its use of biomass to replace coal as a fuel source in the near term, then the United States should be able to capitalize on its existing trade relationship. The United States would be well positioned to supply pellets to Mexico, but new biomass electricity capacity is not expected to come online in the near term.

Figure 3: Global Import Statistics, 2014
Commodity: 440131 (Wood Pellets), kg

Reporting Country	Quantity Imported
United Kingdom	4,715,090,000
Denmark	2,120,784,000
Italy	1,935,962,000
South Korea	1,849,641,264
Belgium	657,899,000
Sweden	521,604,000
Netherlands	383,215,000
Germany	370,207,000
Austria	341,682,000
USA	219,986,490
Slovenia	161,979,000
France	136,492,000
Japan	96,745,000
Latvia	87,793,000
Norway	73,298,880

Source: GTA

Planning for the Long-Term

Beyond 2015, demand for wood pellets should continue to grow, particularly in markets where emissions policies encourage the use of co-firing. There is a possibility that the UK market will plateau after 2017. The European Commission (EC) stated that it will not adopt an EU-wide policy regarding sustainability certification for wood pellets until 2020.

Some EU member states, such as the Netherlands, have moved ahead with sustainability certification requirements. The effect of those requirements on U.S. suppliers remains to be seen. Despite significant evidence that forest growth in the United States exceeds the amount removed, voluntary U.S. private forestry initiatives may not be able to match EU requirements. While in the short term, U.S. exports to the EU will be minimally affected, there is a potential for U.S. exports to be completely disrupted in 2017 and beyond.

Regardless, the United States will have to protect its market share in many of its top markets, as Russia and its neighbors in the Baltic region increase production and as the strength of the dollar makes U.S. pellets more expensive. In many European countries, Russia was able to expand its market share by providing cheap wood pellets in 2014.[98]

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Appendix 1: Ethanol Blend Mandates for countries included in the Top Markets Report

Country	2015 Blend Mandate (%)	2016 Blend Mandate (%)	Notes
Brazil	27.5	27.5	
Canada	5	5	5% is the overall national requirement but actual blend rate is higher due to higher provincial mandates (Saskatchewan and Manitoba mandates - 7.5% and 8.5%, respectively) and discretionary blending
China	10	10	Mandate only applies to the following provinces: Jilin, Jeilongjiang, Liaoning, Henan, Anhui, Hebei, Hubei, Jiangsu, Shangdong, Guangxi, Hainan
Colombia	8%	10	Blending target for cities with population greater than 500,000; E8 mandate until domestic production meets domestic demand, which is expected to happen in 2015
Finland	8	10	Increasing to 20% by energy content in 2020.
India	5	5	
Jamaica	10	10	
Mexico	2	2	Only applies to Monterrey, Guadalajara and Mexico City; 2010 through 2012 saw unsuccessful attempts to jumpstart a domestic ethanol industry
Netherlands	5.5	5.5	EU directive calls for renewables to account for 10% of energy use in transport for each Member State by 2020
Peru	7.8	7.8	
Philippines	10	10	Will increase to E20, effective 2020
UK	5	5	EU directive calls for renewables to account for 10% of energy use in transport for each Member State by 2020

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Appendix 2: Citations

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